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TRANSMITTAL OF APPEAL BRIEF

Docket No.
00-VE24.35

In re Application of: Robert T. Baum et al.

Application No.	Filing Date	Examiner	Group Art Unit
09/835,649	April 17, 2001	T. Nguyen	2665

Invention: VERTICAL SERVICES INTEGRATION ENABLED CONTENT DISTRIBUTION MECHANISMS

TO THE COMMISSIONER OF PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed: April 2, 2004 .

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Dated: July 1, 2004

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Robert T. Baum et al. Group Art Unit: 2665

Serial No.: 09/835,649 Examiner: T. Nguyen

Filed: April 17, 2001

For: **VERTICAL SERVICES INTEGRATION ENABLED CONTENT DISTRIBUTION MECHANISMS**

Attorney Docket No.: 00-VE24.35

APPEAL BRIEF

MS Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This appeal is taken from the Office Action dated January 7, 2004 rejecting claims 1-3, 6-8, 12-17, and 46-47, which are reproduced as an Appendix to this brief. The Notice of Appeal was timely filed on April 2, 2004. This application was filed on April 17, 2001. Submitted herewith are two additional copies of this Appeal Brief.

I. REAL PARTY IN INTEREST

The real party in interest is Verizon Services Corp., Assignee, a corporation organized and existing under the laws of the state of Delaware, and having a place of business at 1095 Avenue of the Americas, New York, NY 10036.

II. RELATED APPEALS AND INTERFERENCES

Applicants are not aware of any related appeals or interferences that would affect or be affected by the Board's decision on the current appeal.

III. STATUS OF CLAIMS

Claims 1-3 and 6-57 are pending. Claims 4-5 were previously canceled without prejudice. Claims 18-45 and 48-57 are allowed. Claims 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. Claims 1-3, 6-8, 12-17, and 46-47 have been rejected and are at issue in this appeal.

IV. STATUS OF AMENDMENTS

No Amendment has been entered into the prosecution history of the present application subsequent to the Office Action dated January 7, 2004.

V. SUMMARY OF THE INVENTION

The invention of the present patent application relates to implementing data communication services, for example in a local access network utilizing digital subscriber line (DSL) technology, to support quality of service (QoS) and local introduction of vertical services. Certain aspects of the invention relate to distributing content from a hub site to a server located at a central office through such a network. (Specification, page 1, lines 6-10.)

Fig. 4B of the application illustrates an exemplary digital subscriber line data network with a central content server 28 proximate to the hub site 24 and a local content server 32 in the vertical services domain 13 proximate to the central office 15, which is a useful reference to explain the invention of the present application. The inventive network architecture enables the delivery of demanding IP-based services to subscribers without affecting existing Internet tiers of service, such as subscriber access rates. The architecture utilizes an access switch 19 proximate to the central office 15 and capable of segregating upstream traffic by communication type. The switch 19 can examine and selectively forward data packets based on relatively higher layers of a protocol stack, i.e. information encapsulated within the layer-2 information that is utilized as the lowest level definition of connectivity through the network. (Specification, page 14, lines 23-30.)

In the downstream direction, the switch 19 aggregates traffic for each subscriber terminal. The switch 19 receives rate-limited traffic from a packet-switched network on the subscriber's logical circuit. The switch 19 also receives any downstream traffic intended for the subscriber from the vertical services network 13. The switch 19 combines the traffic from these two sources and sends the combined communications downstream over the subscriber's logical circuit to the customer premises at the optimum downstream rate that the subscriber's facilities can support. The upstream segregation and the downstream aggregation allow insertion of new localized services on a "vertical" basis, at an intermediate node. (Specification, page 15, lines 4-11).

To support insertion of localized services, the network includes mechanisms for efficiently distributing content data between the central hub site 24 and the servers 32 in the local vertical services domain 13. Data replicated from the central content server 28 to the respective local content servers 32 can be conveniently communicated over the link 27 between the hub site 24 and central offices 15, which link 27 also carries the customers' broader network traffic. (Specification, page 15, lines 14-24.)

During replication of data between the central content server 28 and the respective local content servers 32, the present invention mitigates the problem of network congestion by only transferring the replicated content data using bandwidth that is not used by broader classes of network traffic. The network utilizes a mechanism that determines bandwidth that is unused by subscriber traffic over the transmission line 27 and transmits content data from the central content server 28 to the local content server 32 using the unused bandwidth. This mechanism only distributes content via the unused bandwidth of transmission line 27, without interfering with the quality of subscriber traffic. (Specification, page 15, lines 24-27 and page 34, lines 16-22.)

Figure 4C provides an exemplary illustration of bandwidth utilization, in terms of time, for exemplary transmission line 27. On the y-axis 70, the bandwidth utilization is expressed from 0 to 100%. On the x-axis 68, time is expressed in the units of hours, from 0 to 24. The subscriber traffic 62 varies over time and at times is close to utilizing 100% of the bandwidth of transmission line 27. However, at other times subscriber traffic utilizes less than the entire bandwidth of transmission line 27. The mechanism described above can monitor the bandwidth utilization of subscriber traffic 62. By using bandwidth

utilization information, content distribution 64 can be implemented over bandwidth unused by subscriber traffic 62. Content distribution 64 fills up the bandwidth transmission line 27 when subscriber traffic utilizes less than 100% of the bandwidth of the transmission line 7. (Specification, pages 34, line 23 to page 35, line 2.)

Region 66 of Figure 4C illustrates bandwidth that is reserved for content distribution. Normally this reserved bandwidth 66 is minimal and merely serves the purpose of maintaining sessions between the central content server 28 and local content servers 32 for content distribution 64. The "as-available" bandwidth may use up to the entire capacity of the link 27 when and if available; or the network may impose a maximum rate limit on the content distribution circuit. The network can distribute the content data using "as-available" bandwidth by prioritizing and queuing data transmission at the switch 19 and the gateway router 29. In one embodiment, the transmission line 27 is an ATM Permanent Virtual Circuit (PVC) provisioned as an Unspecified Bit Rate plus (UBR+) service, which allows content distribution to utilize bandwidth on an "as-available" basis. (Specification, page 35, line 3 to page 36, line 9.)

The mechanism for distributing content from the central content server 28 to the local server 32 uses a congestion mechanism to prevent data loss and utilize unused bandwidth. One such congestion mechanism is Transmission Control Protocol (TCP). TCP employs a window based end-to-end congestion control mechanism to recover from segment loss and also avoid congestion collapse. (Specification, page 35, lines 9-13.)

VI. ISSUES

1. With respect to independent claims 1 and 46, does LaJoie[1] teach "determining unused bandwidth"?

2. With respect to independent claims 1 and 46, does either Easty[2] or LaJoie teach "transmitting content data...on the determined unused bandwidth"?

[1] U.S. Patent No. 5,850,218 to LaJoie et al.
[2] U.S. Patent No. 6,189,008 to Easty et al.

3. With respect to dependent claim 7 and independent claim 46, does either Easty or LaJoie teach "transmitting the content data stored on the at least one second server to a data switch proximate to the at least one second server"?

4. With respect to dependent claim 7 and independent claim 46, does either Easty or LaJoie teach "integrating the content data...at the data switch via the common link"?

5. With respect to dependent claim 13, does either Easty or LaJoie teach "utilizing priority and queuing in at least one node of the access data network, to implement a minimum bandwidth and provide additional bandwidth as available on the common link"?

6. With respect to dependent claim 14, does either Easty or LaJoie teach implementing a "congestion mechanism"?

7. With respect to dependent claim 15, does either Easty or LaJoie teach "the congestion mechanism comprises Transmission Control Protocol (TCP)"?

VII. GROUPING OF CLAIMS

1. Claims 1-3, 6, 12, and 16-17 rise and fall together. *See* Issue Nos. 1-2

2. Claims 7-8 rise and fall together. *See* Issue Nos. 3-4

3. Claims 46-47 rise and fall together. *See* Issue Nos. 1-4

4. Claim 13 rises and falls alone. *See* Issue No. 5.

5. Claim 14 rises and falls alone. *See* Issue No. 6.

6. Claim 15 rises and falls alone. *See* Issue No. 7.

Reasons for separate patentability of the above-identified Claim Groups 1-6 are presented in the Arguments section pursuant to 37 C.F.R. § 1.192(c)(5).

VIII. ARGUMENT

In the Office Action dated January 7, 2004 (hereinafter "the Office Action"): claims 1-3, 6-7, 12-16, and 46 were rejected under 35 U.S.C. §103(a) as being obvious over U.S. Patent No. 6,189,008 to Easty et al. ("Easty") in view of U.S. Patent No. 5,850,218 to LaJoie et al. ("LaJoie"); and claims 8, 17, and 47 were rejected under 35 U.S.C. §103(a) as being obvious over Easty in view of LaJoie and further in view of U.S. Patent No. 6,097,720 to Araujo et al. ("Araujo"). The Examiner has allowed claims 18-45 and 48-57 and indicated that claims 9-11 would be allowable if re-written in independent form.

Appellants respectfully submit that the Office Action fails to establish a *prima facie* case of obviousness against claims 1-3, 6-8, 12-17, and 46-47. A *prima facie* case of obviousness requires, among other things, that the applied references teach or suggest all of the claim limitations. *See* MPEP §2143; *In re Vaeck* 947 F.2d 488, 493, 20 USPQ2d 1438, 1444 (Fed. Cir. 1991); *In re Royka*, 490 F.2d 981, 180 USPQ 560, 562 (CCPA 1972). Appellants respectfully traverse the 103(a) rejections because the references cited in the Final Office Action merely "generally address" some of the elements included in Appellants' claims. Consequently, the references do not teach every element of the claims, and the rejections do not satisfy the standard set forth by the Federal Circuit in *In re Thrift*, Case Number 01-1445 (Fed. Cir. August 9, 2002), which prohibits the rejections of claims based on a "very general and broad conclusion" when "cited references do not support each limitation" in a claim.

A. Issue No. 1: "Determining Unused Bandwidth"

Independent claims 1 and 46 recite, "determining unused bandwidth on a common link of an access data network carrying subscriber traffic and over which the central content server located in a hub site and the at least one local content server located in a central office communicate...." The prior art references cited by the Examiner against claims 1 and 46 (Easty in view of LaJoie) do not disclose this claim limitation.

The Examiner admits that Easty does not disclose "determining unused bandwidth" (Office Action, page 3). The Examiner then asserts that LaJoie teaches this

claim limitation. However, the cited portion of LaJoie (col. 11, line 67 to col. 12, line 5) teaches instead that media servers 16 require a great deal of bandwidth, and accordingly should be connected to a digital switch or multiplexer 17 or an interactive cable gateway 18 directly until intermediate networks with sufficient bandwidth become available.

LaJoie includes no teaching of how to discover whether intermediate networks are available for the media server 16 traffic, much less any teaching of "determining unused bandwidth." If LaJoie contains any teaching relevant to claims 1 and 46, it is that existing intermediate nodes are not capable of handling demands from media transmissions without causing delays and other problems over a network. Thus, LaJoie at most recognizes a problem with existing networks that is solved by the claimed invention's implementation of a novel network architecture having an enhanced switch at an intermediate node (Specification, page 10, lines 12-14). LaJoie teaches against the approach of the present invention; LaJoie's only disclosed solution for the deficiencies of existing intermediate nodes is to connect directly its media server 16 to a switch until improved intermediate networks become available. LaJoie in no way teaches "determining unused bandwidth on a common link" as recited in claims 1 and 46 and moreover fails to teach any dynamic determination of unused bandwidth. Mere knowledge that high-bandwidth media servers 16 must be connected directly to a switch until improved intermediate networks become available in no way includes a teaching of "determining unused bandwidth" as recited in claims 1 and 46.

In fact, LaJoie's teachings related to "bandwidth" are limited to the following: the high bandwidth requirements of media servers 16 (*see* col. 3, lines 16-19; col. 11, line 67 to col. 12, line 5); the relatively low bandwidth requirements of application servers 15 (*see* col. 11, lines 64-67); and the upper and lower bandwidth limits for frequency divided channels (*see* col. 10, lines 42-61). These teachings simply do not read on the claim limitation of "determining unused bandwidth".

Moreover, the high bandwidth requirements of LaJoie's media servers 16 are not at all relevant to the common link on which unused bandwidth is determined in the recited methods of claims 1 and 46. LaJoie's teachings of the high bandwidth requirements for media servers 16 are limited to requirements within the headend 2 of the system taught by LaJoie (*see* Fig. 1). In LaJoie, the media server 16 must be directly

connected to either the digital switch 17 or the cable gateway 18, all of which are located at the headend 2. The bandwidth requirements within the headend 2 are not related to, and in no way teach, determining unused bandwidth on a common link over which communications between a hub site and a local content server located in a central office are carried as recited in claims 1 and 46.

Because LaJoie does not teach the claim limitation of "determining unused bandwidth...," the Office Action fails to establish a *prima facie* case of obviousness against independent claims 1 and 46. Thus, claims 1, 46, and all of their dependent claims at issue in this appeal (claims 2-3, 6-8, 12-17, and 47) are in condition for allowance.

B. Issue No. 2: "Transmitting Content Data...on the Determined Unused Bandwidth"

Independent claims 1 and 46 recite the claim limitation of "transmitting content data...on the determined unused bandwidth." The Office Action (page 2) asserts that Easty (col. 6, lines 17-21) teaches this claim limitation.

However, the cited portion of Easty discloses no more than an agenting section 11b in a central server 11 that generates aggregate information for each endpoint server 13, including aggregate affinity and demographic information, and weighs and correlates the aggregate information to generate an aggregate profile for each endpoint server. This disclosure is not even remotely directed to "transmitting content data...on the *determined unused bandwidth*." (Emphasis added). In fact, Easty's only mention of "bandwidth" is as follows at col. 1, lines 31-36:

> "In an upgraded cable system, the ***bandwidth*** of the cable is typically divided into a relatively wide ***bandwidth*** for downstream data transmission (i.e. from the network to the PCs in the households) and a relatively narrow ***bandwidth*** for upstream signaling and telephony. A cable modem incorporates a tuner that separates data signals, broadcast streams and telephony signals."

(Emphasis added.) Clearly, Easty is completely silent as to any type of teaching related to "unused bandwidth."

The Examiner does not contend that LaJoie teaches "transmitting content data...on the determined unused bandwidth." Indeed, inasmuch as LaJoie does not teach "determining unused bandwidth", LaJoie is clearly incapable of teaching or suggesting

the claim limitation of "transmitting content data...on the *determined unused bandwidth*." (Emphasis added.)

Easty and LaJoie, taken either alone or in combination, clearly do not teach replicating content data by determining unused bandwidth and transmitting content data on the determined unused bandwidth. Because neither Easty, LaJoie, nor any combination thereof teach these claim limitations, the Office Action fails to establish a *prima facie* case of obviousness against independent claims 1 and 46. Thus, claims 1, 46, and all of their dependent claims at issue in this appeal (claims 2-3, 6-8, 12-17, and 47) are in condition for allowance.

C. Issue No. 3: "Transmitting the Content Data Stored on the at Least One Second Server to a Data Switch Proximate to the at Least One Second Server"

Dependent claim 7 and independent claim 46 recite the claim limitation of "transmitting the content data stored on the at least one second server to *a data switch proximate to the at least one second server*." (Emphasis added.) The Office Action (page 4) asserts that Easty (Figure 1; col. 5, lines 25-45) teaches this claim limitation.

However, neither cited portion of Easty teaches a "data switch," much less a "data switch *proximate to* the at least one second server." (Emphasis added.) Easty nowhere contains any mention of a "data switch" or "multiplexer". The cited portions of Easty actually teach a distribution of content from a central server 11 to an endpoint server 13. This teaching in no way suggests "transmitting the content data stored on the at least one second server to a data switch proximate to the at least one second server." The cited portions of Easty simply do not include any mention of content data being transmitted from an endpoint server 13 to a data switch proximate to the endpoint server 13.

LaJoie similarly lacks any teaching of a "data switch *proximate to* the at least one second server" because the second server of claims 7 and 46 is located in a central office that communicates by a common link with a central content server at a hub site (*see* claim 1), whereas the data switch or multiplexer 17 taught by LaJoie is restricted to the headend 2 (Figure 1). A switch 17 located at the headend 2 does not provide the system of LaJoie with the capability to insert vertical services proximate the second server while maintaining QoS standards. Indeed, a unique advantage of the present invention's novel

network architecture, embodied in claims 7 and 46, is that it alleviates network problems (e.g., virtual circuit congestion and unpredictable QoS levels due to demanding high-bandwidth transmissions like voice over IP and video on-demand, etc.) by providing an intermediate node, typically an enhanced switch, to segregate upstream traffic and aggregate downstream traffic (Specification, page 8, lines 1-15 and page 10, lines 12-14 and 21-22). As discussed above in Section A, LaJoie, in contrast, teaches away from the use of an intermediate node for high-bandwidth media services (col. 11, line 67 to col. 12, line 5).

Because neither Easty, LaJoie, nor any combination thereof teaches "transmitting the content data stored on the at least one second server to *a data switch proximate to the at least one second server,*" the Office Action fails to establish a *prima facie* case of obviousness against claims 7 and 46. Thus, claims 7, 46, and all of their dependent claims at issue in this appeal (claims 8 and 47) are in condition for allowance.

D. Issue No. 4: "Integrating the Content Data...at the Data Switch via the common link"

Dependent claim 7 and independent claim 46 recite the claim limitation of "integrating the content data...*at the data switch* via the common link." (Emphasis added.) The Office Action (page 4) asserts that Easty (Figure 1; col. 5, lines 25-45) teaches this claim limitation. Appellants respectfully disagree.

As discussed above in Section C, the cited portions of Easty merely disclose a distribution of content from a central server 11 to an endpoint server 13, but do not include any mention of a data switch proximate to the at least one second server. As further discussed above, LaJoie fails to teach a data switch proximate to the at least one second server. Accordingly, neither Easty nor LaJoie is capable of teaching or suggesting the limitation of "integrating the content data...at the data switch via the common link." Moreover, even if Easty or LaJoie taught integrating content data, they are limited to integrating content data at a headend 2 in LaJoie (*see* LaJoie, Figure 1) and at a central server 11 in Easty (*see* Easty, Figures 1 and 2). By integrating data only at a headend 2 or central server 11, Easty and LaJoie teach away from the claim limitation of integrating content data *at the data switch*, especially considering that the claimed data switch is "proximate to the at least one second server."

Based on at least the foregoing, the Office Action fails to establish a *prima facie* case against claims 7 and 46. Thus, claims 7, 46, and all of their dependent claims at issue in this appeal (claims 8 and 47) are in condition for allowance.

E. Issue No. 5: "Utilizing Priority and Queuing in at Least One Node of the Access Data Network, to Implement a Minimum Bandwidth and Provide Additional Bandwidth as Available on the Common Link"

Dependent claim 13 recites the claim limitation of "utilizing priority and queuing in at least one node of the access data network, to implement a minimum bandwidth and provide additional bandwidth as available on the common link." The Office Action (pages 4-5) asserts that Easty (col. 4, lines 22-36; col. 5, lines 5-16) teaches the limitations recited in claim 13. However, the portions of Easty cited in the Office Action are completely unrelated to the limitations of claim 13, disclosing no more than generating and updating a user profile based on acquired user information (col. 4, lines 22-36). The user profile is then used to make content selection recommendations for a user (col. 5, lines 5-16). These teachings clearly fail to even remotely read on "utilizing priority and queuing in at least one node of the access data network, to implement a minimum bandwidth and provide additional bandwidth as available on the common link."

For the foregoing reasons, the Office Action fails to establish a *prima facie* case of obviousness with respect to claim 13, which accordingly is in condition for allowance.

F. Issue No. 6: "Congestion Mechanism"

Dependent claim 14 recites the claim limitation of a "congestion mechanism to prevent data loss and utilize unused bandwidth." The Office Action (pages 4-5) asserts that Easty (col. 4, lines 22-36; col. 5, lines 5-16) teaches the limitations recited in claim 14. However, the Office Action does not address the claim limitation of a "congestion mechanism."

As discussed above in Section C, the cited portions of Easty disclose generating and updating a user profile based on acquired user information (col. 4, lines 22-36). The user profile is then used to make content selection recommendations for a user (col. 5, lines 5-16). These teachings are completely unrelated to the claim limitation of a "congestion mechanism."

Indeed, the Specification makes clear that the recited "congestion mechanism" has nothing to do with the user profile information taught by Easty. As the Specification explains, the distribution of content from the central content server to the local server utilizes a congestion mechanism to prevent data loss and to determine and utilize unused bandwidth (page 35, lines 9-11 and page 37, lines 1-3). The congestion mechanism further enables recovery from segment loss and avoidance of congestion collapse (page 35, lines 11-13). The congestion mechanism can employ Transmission Control Protocol (TCP) and/or Unspecified Bit Rate (UBR+) service (page 35, line 11 and page 37, lines 4-6). Easty's teaching of generating and updating user-profile-based content recommendations includes no mention of a "congestion mechanism" or any mechanism for preventing data loss and utilizing unused bandwidth, and in addition fails to even remotely suggest the benefits provided by employing the "congestion mechanism."

For the foregoing reasons, the Office Action fails to establish a *prima facie* case of obviousness with respect to claim 14, which accordingly is in condition for allowance.

G. Issue No. 7: "The Congestion Mechanism Comprises Transmission Control Protocol (TCP)"

Dependent claim 15 recites that "the congestion mechanism comprises Transmission Control Protocol (TCP)." The Office Action (page 2) asserts that Easty (Figure 2; col. 6, lines 5-16; col. 6, lines 17-21) teaches the limitations recited in claim 15. However, the Office Action fails to address the claim limitation that "the congestion mechanism comprises Transmission Control Protocol (TCP)." Further, Easty and LaJoie wholly fail to mention "Transmission Control Protocol" or "TCP".

Appellants respectfully submit that neither Easty nor LaJoie teaches a congestion mechanism comprising Transmission Control Protocol (TCP) and that claim 15 is therefore in condition for allowance.

IX. CONCLUSION

In view of the foregoing arguments, Appellants respectfully submit that the pending claims are novel over the cited references. The Examiner's rejection of Claims 1-3, 6-8, 12-17, and 46-47 is improper because the prior art of record does not teach or

suggest each and every element of the claimed invention. In view of the above considerations, a reversal of the rejections of record is respectfully requested of this Honorable Board.

It is believed that any fees due with respect to this paper have been identified in a transmittal accompanying this paper. However, if any additional fees are required in connection with the filing of this paper that are not identified in any accompanying transmittal, permission is given to charge Deposit Account No. 07-2347, under Order No. 00-VE24.35, from which the undersigned is authorized to draw. To the extent necessary, a petition for extension of time under 37 C.F.R. § 1.136(a) is hereby made, the fee for which should be charged to the aforementioned deposit account.

Respectfully submitted,

Date: July 1, 2004

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Enclosure – Appendix

X. APPENDIX – CLAIMS ON APPEAL

1. A method of replicating content data stored on a central content server to at least one local content server, comprising the steps of:

determining unused bandwidth on a common link of an access data network carrying subscriber traffic and over which the central content server located in a hub site and the at least one local content server located in a central office communicate; and

transmitting content data stored on the central content server to the at least one local content server substantially on the determined unused bandwidth.

2. The method of claim 1, wherein said at least one local content server comprises a server located in a vertical services domain proximate to at least one end user terminal.

3. The method of claim 2, wherein the vertical services domain is located in a central office that provides Digital Subscriber Line (DSL) service to the at least one end user terminal.

6. The method of claim 1, comprising the further steps of:

storing the content data transmitted to the at least one local content server on the at least one local content server; and

transmitting the content data stored on the at least one local content server to at least one end user terminal proximate to the at least one local content server.

7. The method of claim 6, wherein the step of transmitting the content data stored on the at least one second server to the at least one end user terminal comprises the steps of:

transmitting the content data stored on the at least one second server to a data switch proximate to the at least one second server;

integrating the content data transmitted from the at least one second server with other data destined to the at least one end user terminal received at the data switch via the common link; and

distributing the integrated data from the data switch to a link to equipment of the at least one end user terminal via a multiplexer.

8. The method of claim 7, wherein the multiplexer is a Digital Subscriber Line Access Multiplexer (DSLAM).

12. The method of claim 1, wherein a part of the bandwidth of the common link is reserved for transmitting the content data stored on the central content server to the at least one local content server to prevent the loss of a session between the central content server and the at least one local content server.

13. The method of claim 1, wherein the steps of determining unused bandwidth and transmitting content data utilize priority and queuing in at least one node of the access data network, to implement a minimum bandwidth and provide additional bandwidth as available on the common link, for the transmitting of the content data over the common link.

14. The method of claim 1, wherein the steps of determining unsued bandwidth and transmitting content data implement a congestion mechanism to prevent data loss and utilize unused bandwidth.

15. The method of claim 14, wherein the congestion mechanism comprises Transmission Control Protocol (TCP).

16. The method of claim 1, wherein the transmitting step utilizes an unspecified bit rate service through the common link.

17. The method of claim 1, wherein the common link of the network also carries logical circuits for wide area data communications of a plurality end user terminals.

46. A method of replicating content data stored on a central content server to at least one local content server, comprising the steps of:

determining unused bandwidth on a common link of an access data network carrying subscriber traffic and over which central content server and the at least one local content server communicate;

transmitting content data stored on the central content server to the at least one local content server substantially on the determined unused bandwidth;

storing the content data transmitted to the at least one local content server on the at least one local content server; and

transmitting the content data stored on the at least one local content server to at least one end user terminal proximate to the at least one local content server, wherein the step of transmitting the content data stored on the at least one second server to the at least one end user terminal comprises the steps of:

transmitting the content data stored on the at least one second server to a data switch proximate to the at least one second server,

integrating the content data transmitted from the at least one second server with the other data destined to the at least one end user terminal received at the data switch via the common link, and

distributing the integrated data from the data switch to a link to equipment of the at least one end user terminal via a multiplexer.

47. The method of Claim 46, wherein the multiplexer is a Digital Subscriber Line Access Multiplexer (DSLAM).